

Weekly Report

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July 28, 2013

1 Project

This week, I revised and updated the patents written by Haonan and Zhiyu. All three patents will be sent to the lawyer soon.

2 Research

This week, I redesigned the uncertainty glyph representation in our uncertainty-aware projection framework for exploration of ensemble dataset. In this version, we employed a bar code representation. More specifically, the width of the glyph encodes the overall uncertainty for each ensemble data item. The pattern shown by the color and the lines displays the distribution of deviations for each ensemble data item. The color of this representation encodes the order of deviations. The line indicated the relative position of each deviation. More details will be discussed in our paper once the final version is done. Next week, we will try a new discretized version of this representation. Figure 1 shows an example of this representation. Figure 1(a) displays a left skewed distribution with three outliers. Figure 1(b) shows a uniform-close distribution.

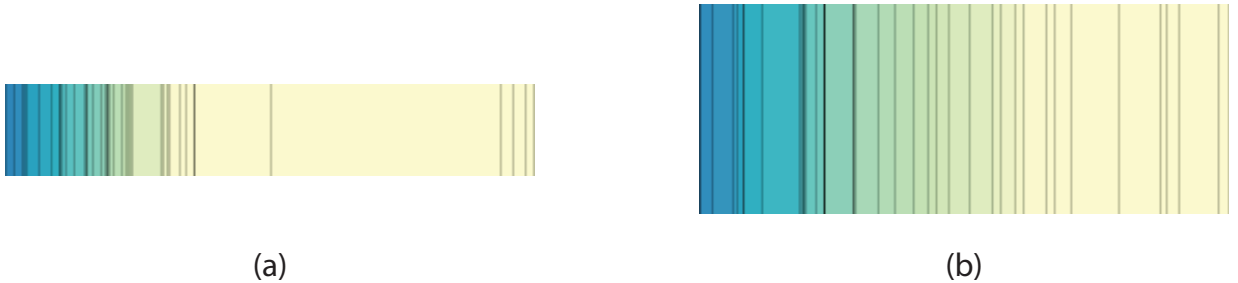


Figure 1: Two examples of bar code based uncertainty glyph representation.

Besides the visual encoding of deviations, I also investigated the result we got before. We discovered that our method can achieve more reliable projection of high-dimensional ensemble dataset. The traditional method which only considers the ensemble mean is prone to introduce noise in the process of projection. More discussion will be delineated in our paper. Figure 2 shows the comparison of our method and the projection techniques only considering the ensemble mean.

In addition, I also read several papers on shape analysis of curves with Riemannian Manifold [1, 2]. We decide to employ Riemannian Manifold framework to project all fibers from different fiber models into a visual 2D space to investigate the difference of different fiber models. Currently, I have already figure out how to implement this framework. Once I fished the vis paper revision, I will focus on this work hoping to submit this work to PVis 2014 by 2nd Sep..

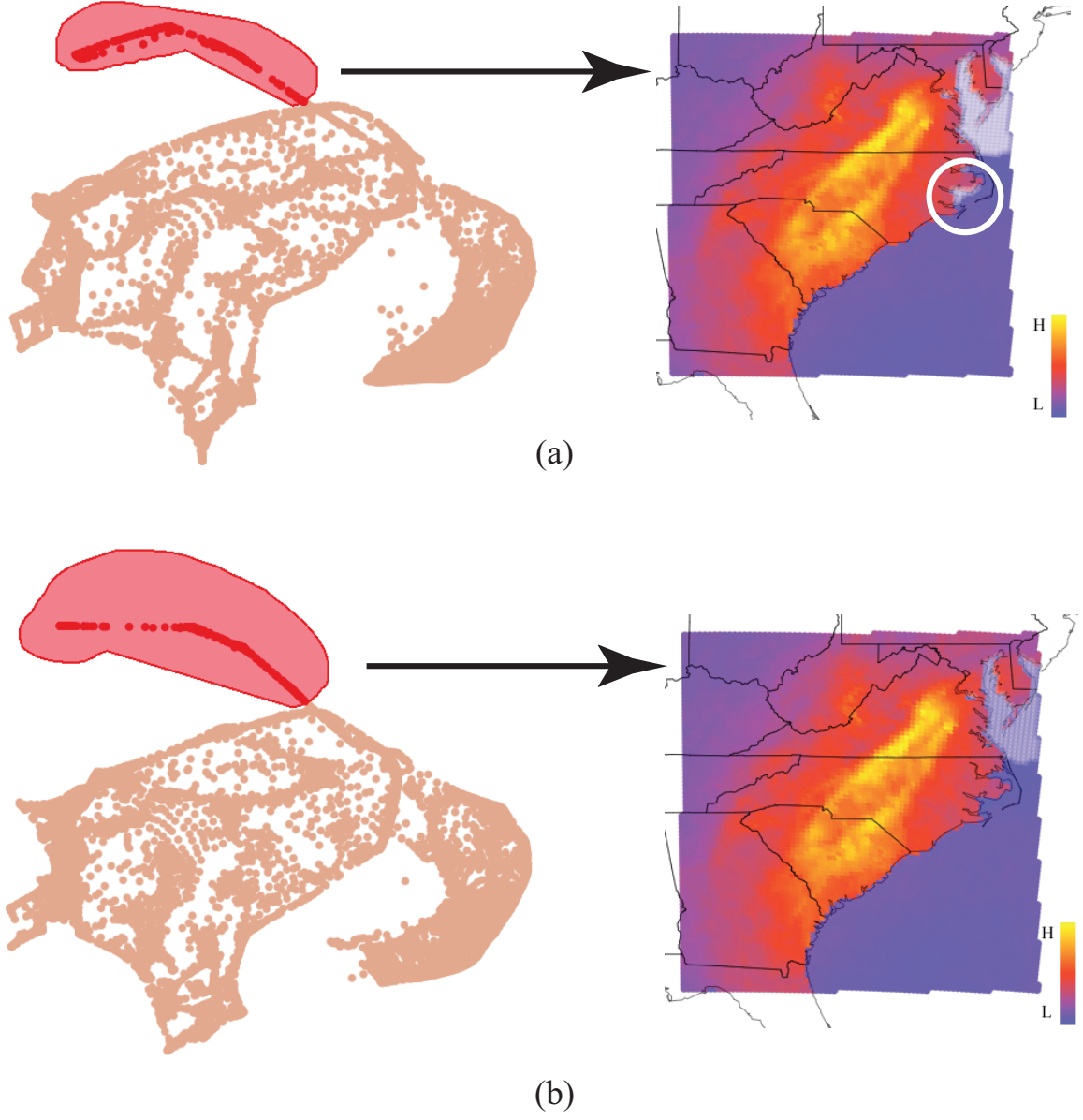


Figure 2: Projection comparison between our method and the tradition project technique only considering the ensemble mean. (a) The projection result of the method only considering the ensemble mean, notice the noise produced in region indicated by the white circle. (b) The result of our method.

3 Work to do in next week

- Contact the lawyer and send all patents to him
- Finish revision of the paper

References

- [1] Sebastian Kurtek, Anuj Srivastava, Eric Klassen, and Zhaohua Ding. Statistical modeling of curves using shapes and related features. *Journal of the American Statistical Association*, 107(499):1152–1165, 2012.
- [2] Meena Mani, Sebastian Kurtek, Christian Barillot, and Anuj Srivastava. A comprehensive riemannian framework for the analysis of white matter fiber tracts. In *Biomedical Imaging: From Nano to Macro, 2010 IEEE International Symposium on*, pages 1101–1104. IEEE, 2010.